**Introductory to Operating Systems**

**COP 4600-002**

Name and ID \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Worksheet #7**

Q1. Given the following set of processes with, arrival times, burst times, priorities

|  |  |  |  |
| --- | --- | --- | --- |
| **Process** | **Arrival time** | **Burst time** | **Priority** |
| **P1** | **0** | **9** | **4** |
| **P2** | **1** | **6** | **2** |
| **P3** | **3** | **1** | **1** |
| **P4** | **2** | **5** | **3** |
| **P5** | **5** | **2** | **2** |

1. Draw four Gant charts that illustrate the execution of these processes using the following scheduling algorithms: FCFS, SJF (Shortest-Job First), non-preemptive priority, preemptive Shortest-Remaining–time first
2. What is the turnaround time of each process for each of the scheduling algorithms in part 1?
3. What is the waiting time of each process for each of the scheduling algorithms in part 1?
4. What is the average waiting time over all processes for each of the scheduling algorithms in part 1?

Q2. The CPU and I/O times for 2 processes are shown below. Assume that P1 gets to the ready queue just before P2 and the scheduling algorithm used by the OS is **Round Robin** with **a time slice of 4 time units**. Assume that the I/Os for the processes are different so that there is no I/O queue. Assume also that **an interrupt from a completed I/O for process "X" will place process "X" in the ready queue BEHIND the process that was just interrupted.**

Using the first empty graph, describe how the CPU will be assigned to each process and for how long.

U se the second empty graph to show ALL the states that P1 goes through and the amount of time it has remained in that state until it has halted.

5006

2006

I/O

CPU

3

2006

P1:

2006

Busy CPU

Idle CPU

States P1

16

26

96

3

2

I/O

CPU

P2: